

## Trend Study 18A-29-07

Study site name: Deadman Canyon.

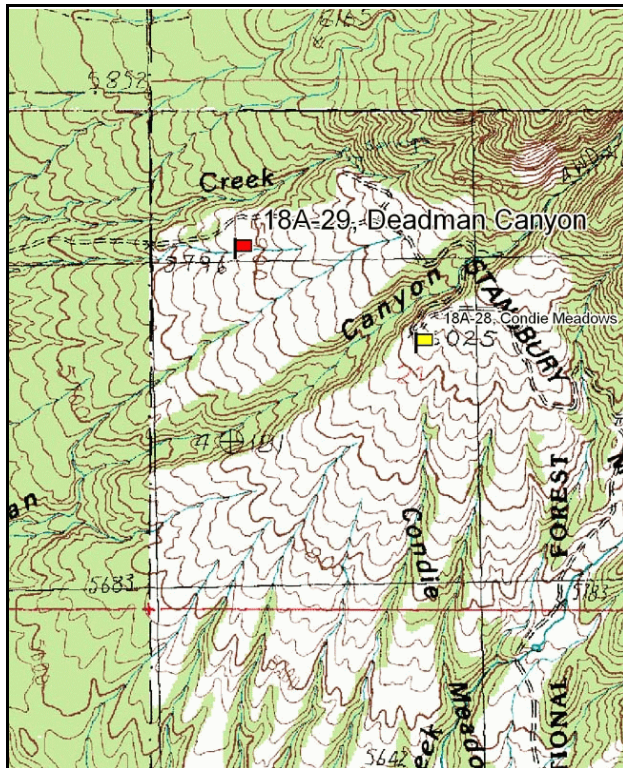
Vegetation type: Chained, Seeded PJ.

Compass bearing: frequency baseline 185 degrees magnetic.

Frequency belt placement: line 1 (11 & 95ft), line 2 (34ft), line 3 (59ft), line 4 (71ft).

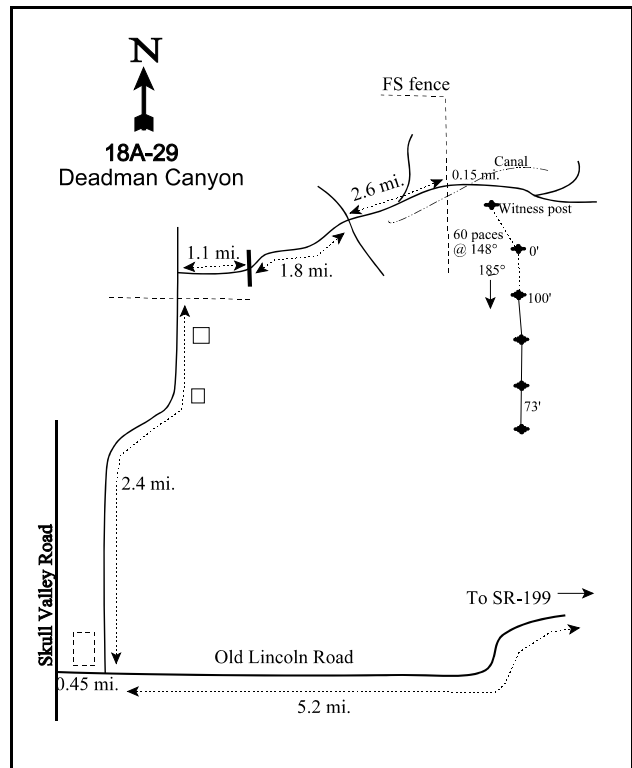
### LOCATION DESCRIPTION

From SR-199, go 5.2 miles west on Old Lincoln Road. Turn north and go 2.0 miles to the Williams Ranch. Continue 0.4 mile and turn right at the fork just past a fence. Go 1.1 miles to a gate. Continue 1.8 miles to an intersection, continue northeasterly. Go 2.6 miles to the Forest Service boundary fence. From the cattle guard, go 0.15 miles to a witness post on the right side of the road. From this fence post, walk 60 paces south (148 degrees) to the 0-foot baseline stake. It is marked by a red browse tag, number 3927.



Map Name: Terra

Township 5S, Range 7W, Section 21



Diagrammatic Sketch

GPS: NAD 83, UTM 12T 360195 E 4470211 N

## DISCUSSION

### Deadman Canyon - Trend Study No. 18A-29

#### Study Information

This study, although located only a short distance from the suspended Condie Meadows (18A-28) study, samples a markedly different community [elevation 5,880 feet (1,792 m), slope: 10%, aspect: west]. This is a former pinyon-juniper woodland that has been chained and seeded with perennial grasses. Initially, there was no evidence that any shrub or forb species were included in the seed mixture, however, a fair browse stand remains. Deer use was moderate in 1997 with a quadrat frequency of 29%. Pellet group transect data estimated 58 deer days use/acre (142 ddu/ha) in 2002 and only 14 deer days/acre (35 ddu/ha) in 2007. Elk use was estimated at 1 elk day use/acre (2 edu/ha) in 2007. Rabbit pellet quadrat frequency was 55% in 2002 and 69% in 2007.

#### Soil

The soil is classified within the Abela series (USDA-NRCS 2007). Soils in this series are described as very gravelly loams. They are deep, well-drained, and formed in alluvium or lacustrine deposits derived from limestone, sandstone, and quartzite. The soil is rocky in the upper horizons with a clay loam texture. The soil reaction is neutral (pH 7.3). The soil phosphorus is relatively low at 6.8 ppm. Grasses, especially bluebunch wheatgrass (*Agropyron spicatum*), are well-established and provide valuable protection from erosion. Moderate erosion was thought to be occurring in 1983. Erosion has since been negligible and the soil erosion condition class was determined as slight in 2002 and 2007 due to some pedestalling and soil flow patterns.

#### Browse

The browse composition consists of a mixed stand of Wyoming big sagebrush (*Artemisia tridentata* spp. *wyomingensis*), Stansbury cliffrose (*Cowania mexicana* ssp. *stansburiana*), and Utah juniper (*Juniperus osteosperma*). Other shrub species, such as broom snakeweed (*Gutierrezia sarothrae*), occur infrequently. In 1983, sagebrush density was approximately 500 plants/acre (1,235 plants/ha). Density remained relatively stable from 1989 to 2002 between 800 plants/acre (1,977 plants/ha) and 880 plants/acre (2,174 plants/ha). In 2007, sagebrush density was 1,000 plants/acre (2,471 plants/ha). Average cover was 3% in 1997 and 2007, and 5% in 2002. The age structure of the sagebrush population has shifted, from a composition of only young and mature plants in 1983 to only mature and decadent plants in 2007. Decadent plants constituted only 10% of the population from 1983 to 2002, but made up 42% in 2007. Vigor has been good throughout the study, however, in 2007, 18% of the plants displayed poor vigor. Use has been mostly light-moderate. Average annual leader growth was 1.2 inches (3.2 cm) in 2002 and 2007.

Cliffrose density ranged between 199 plants/acre (492 plants/ha) in 1983 and 120 plants/acre (297 plants/ha) in 2002. Average cover has been 3%-4% since 1997. Decadence increased from 0% of the population in 1997 and 2002 to 43% in 2007. Young plants made up 11% of the population in 1997 and 17% in 2002, but no young plants were sampled in 2007. Vigor has been relatively good since 1983. Cliffrose utilization was moderate-heavy in 1983 and 1989, light in 1997, and light-moderate in 2002 and 2007. Average annual leader growth was 1.4 inches (3.6 cm) in 2002 and 2.7 inches (7 cm) in 2007.

The juniper population has remained at a relatively stable density since 1989. Juniper density was 89 trees/acre (220 plants/ha) in 2002 and 83 trees/acre (205 trees/ha) in 2007. The average trunk diameter was 6.6 inches (16.8 cm) in 2002 and 7.2 inches (18.3 cm) in 2007.

#### Herbaceous Understory

The herbaceous understory is composed mostly of perennial grasses, which increased in cover from 16% in 1997 to 21% in 2007. In 1983, common seeded species included crested wheatgrass (*Agropyron cristatum*) and intermediate wheatgrass (*Agropyron intermedium*). Natives, such as bluebunch wheatgrass (*Agropyron*

*spicatum*) and Sandberg bluegrass (*Poa secunda*), were dominant. Since 1983, the seeded species have steadily declined. The natives, particularly bluebunch wheatgrass, have provided the majority of the grass cover since 1997. Cheatgrass was abundant in 1997, but declined significantly in 2002, most likely due to drought conditions. Cheatgrass cover was 6% in 1997, almost 0% in 2002, and 2% in 2007. Bulbous bluegrass (*Poa bulbosa*) is present, and increased in nested frequency between 2002 and 2007.

Forb composition and abundance have been poor. Forage production from this component is low, and few desirable species have been sampled. The most common forb species include pale alyssum (*Alyssum alyssoides*) and bur buttercup (*Ranunculus testiculatus*). Due to drought conditions, forbs were essentially nonexistent in 2002, and recovered slightly by 2007.

#### 1989 TREND ASSESSMENT

The trend for browse is slightly up. The density of sagebrush increased from 499 plants/acre (1,233 plants/ha) to 832 plants/acre (2,056 plants/ha). Recruitment continued to be high and increased from 47% to 56% of the population. Decadence was very low, but increased slightly from 0% to 4% of the population, and vigor remained good. The majority of the population (84%) showed moderate use. The density of cliffrose remained relatively stable. Decadence increased from 17% to 60%, and recruitment from young plants decreased from 17% of the population to 0%. These changes may reflect the mid-1980s shrub die-off that affected different locations within the Great Basin. Vigor remained good-moderate, and all of the plants sampled were moderately to heavily hedged. The trend for grass is slightly down. The sum of the nested frequency for perennial grasses decreased 20%. There were significant decreases in the nested frequencies of intermediate wheatgrass, Sandberg bluegrass, and bottlebrush squirreltail (*Sitanion hystrix*), while the nested frequency of crested wheatgrass increased significantly. Bluebunch wheatgrass and Sandberg bluegrass were the most abundant grasses. The trend for forbs is stable. Forb species were very sparse and provided little forage value. The number of forb species sampled decreased from 10 to six.

browse - slightly up (+1)

grass - slightly down (-1)

forb - stable (0)

#### 1997 TREND ASSESSMENT

The trend for browse is stable. The density of sagebrush remained relatively stable at 800 plants/acre (1,977 plants/ha). Decadence remained low at 3% of the population, while recruitment remained high. Utilization was mostly light. Cliffrose density increased slightly, from 166 plants/acre (410 plants/ha) to 180 plants/acre (445 plants/ha). No plants were classified as decadent, which was an improvement from 60% in 1989. Young recruitment remained low at 11% of the population. Cliffrose utilization was light. The trend for grass is stable. There was a significant decrease in the nested frequency of crested wheatgrass, while two other perennial grasses significantly increased in nested frequency. The trend for forbs is slightly down. Five more forb species were sampled, but the total nested frequency for perennial forbs greatly decreased. The average cover of forbs was only 3%, and this was made up of annual species that did not provide significant forage. One of the most abundant forb species was bur buttercup, which inhibits the germination and growth of surrounding plants (Buchanan et al. 1978). The Desirable Components Index (DCI) was rated as good-excellent, due to good browse cover with low decadence and abundant young plants, and a favorable perennial grass understory.

winter range condition (DCI) - good-excellent (66) Low potential scale

browse - stable (0)

grass - stable (0)

forb - slightly down (-1)

#### 2002 TREND ASSESSMENT

The trend for browse is stable. The sagebrush density increased slightly, from 800 plants/acre (1,977 plants/ha) to 880 plants/acre (2,174 plants/ha). Decadence remained low at 9% of the population, however, recruitment decreased from 48% of the population to 2%. Use was light-moderate, and vigor was good. The density of cliffrose decreased slightly, from 180 plants/acre (445 plants/ha) to 120 plants/acre (297 plants/ha).

The population remained largely mature, with no decadence and 17% composed of young plants. Fifty percent of the population displayed moderate-heavy use, but the plants were vigorous. The trend for grass is slightly up. The sum of nested frequency for perennial grasses remained similar to 1997, but drought conditions caused a significant decrease in the nested frequency of cheatgrass. Bluebunch wheatgrass accounted for 87% of the total herbaceous cover and 16% of the total ground cover. This species increased significantly in nested frequency. The trend for forbs is slightly down. The sum of nested frequency for both perennial and annual forbs decreased dramatically. Ten forb species were sampled in 1997, but only three annual species remained in 2002. Forbs were virtually nonexistent in 2002. The DCI declined from good-excellent to good, due to a decrease in sagebrush recruitment and the absence of forbs.

winter range condition (DCI) - good (57) Low potential scale

browse - stable (0)

grass - slightly up (+1)

forb - slightly down (-1)

#### 2007 TREND ASSESSMENT

The trend for browse is stable. Sagebrush density continued to increase from 880 plants/acre (2,174 plants/ha) to 1,000 plants/acre (2,471 plants/ha). However, there were no young plants sampled in 2007, and decadence increased from 9% to 42% of the population. Use was mostly light-moderate, but the percent of plants displaying poor vigor increased from 0% to 18%. The cliffrose population followed the same trends as sagebrush. Density increased slightly, from 120 plants/acre (297 plants/ha) to 140 plants/acre (346 plants/ha). No young plants were sampled, and decadence increased from 0% to 43% of the population. However, cliffrose height and crown width increased 21 inches (53 cm) and 19 inches (48 cm), respectively. Use remained moderate-heavy, and 14% of the plants sampled displayed poor vigor. The trend for grass is stable. Sandberg bluegrass increased significantly in nested frequency, however, cheatgrass and bulbous bluegrass also increased significantly. The trend for forbs is slightly down. Bur buttercup increased significantly, and forb diversity remained low. The species that were present are not very useful as forage. The DCI decreased to fair, due to an increase in browse decadence, the absence of browse recruitment, and an increase in annual grasses.

winter range condition (DCI) - fair (40) Low potential scale

browse - stable (0)

grass - stable (0)

forb - slightly down (-1)

#### HERBACEOUS TRENDS --

Management unit 18A, Study no: 29

Type	Species	Nested Frequency					Average Cover %		
		'83	'89	'97	'02	'07	'97	'02	'07
G	Agropyron cristatum	<sub>b</sub> 50	<sub>c</sub> 133	<sub>ab</sub> 31	<sub>a</sub> 2	-	1.17	.03	-
G	Agropyron intermedium	<sub>c</sub> 98	<sub>a</sub> 6	<sub>b</sub> 50	<sub>a</sub> 7	<sub>a</sub> 3	2.03	.41	.00
G	Agropyron spicatum	<sub>a</sub> 159	<sub>a</sub> 165	<sub>ab</sub> 211	<sub>c</sub> 253	<sub>bc</sub> 239	10.55	15.70	16.58
G	Bromus japonicus (a)	-	-	-	-	6	-	-	.01
G	Bromus tectorum (a)	-	-	<sub>c</sub> 228	<sub>a</sub> 20	<sub>b</sub> 86	6.31	.04	1.70
G	Oryzopsis hymenoides	-	-	<sub>a</sub> 2	<sub>a</sub> 3	<sub>a</sub> -	.03	.15	.00
G	Poa bulbosa	<sub>a</sub> 13	-	-	<sub>a</sub> 2	<sub>b</sub> 42	-	.00	.61

T y p e	Species	Nested Frequency					Average Cover %		
		'83	'89	'97	'02	'07	'97	'02	'07
G	<i>Poa secunda</i>	<sub>bc</sub> 122	<sub>a</sub> 51	<sub>b</sub> 91	<sub>b</sub> 117	<sub>c</sub> 173	1.72	1.67	3.85
G	<i>Sitanion hystrix</i>	<sub>b</sub> 17	<sub>a</sub> 1	<sub>ab</sub> 8	-	-	.07	-	-
Total for Annual Grasses		0	0	228	20	92	6.31	0.04	1.71
Total for Perennial Grasses		459	356	393	384	457	15.59	17.98	21.06
Total for Grasses		459	356	621	404	549	21.90	18.02	22.78
F	<i>Agoseris glauca</i>	<sub>a</sub> 4	-	-	-	<sub>a</sub> 3	-	-	.03
F	<i>Alyssum alyssoides</i> (a)	-	-	<sub>b</sub> 241	<sub>a</sub> 17	<sub>c</sub> 301	1.79	.03	3.76
F	<i>Allium</i> sp.	-	-	1	-	-	.03	-	-
F	<i>Antennaria rosea</i>	3	-	-	-	-	-	-	-
F	<i>Arabis</i> sp.	-	<sub>a</sub> 14	<sub>a</sub> 13	-	-	.08	-	-
F	<i>Calochortus nuttallii</i>	<sub>b</sub> 19	<sub>a</sub> 4	<sub>a</sub> 3	-	-	.05	-	-
F	<i>Chaenactis douglasii</i>	7	-	-	-	-	-	-	-
F	<i>Crepis acuminata</i>	3	-	-	-	-	-	-	-
F	Cruciferae	-	1	-	-	-	-	-	-
F	<i>Erigeron</i> sp.	2	-	-	-	-	-	-	-
F	<i>Erigeron pumilus</i>	2	-	-	-	-	-	-	-
F	<i>Holosteum umbellatum</i> (a)	-	-	-	2	-	-	.00	-
F	<i>Lathyrus brachycalyx</i>	<sub>c</sub> 83	<sub>d</sub> 133	<sub>b</sub> 48	-	<sub>a</sub> 4	.58	-	.15
F	<i>Lactuca serriola</i>	-	-	1	-	-	.00	-	-
F	<i>Petradoria pumila</i>	<sub>a</sub> 17	<sub>a</sub> 12	<sub>a</sub> 5	-	-	.02	-	-
F	<i>Phlox longifolia</i>	<sub>a</sub> 8	<sub>a</sub> 3	<sub>a</sub> 8	-	<sub>a</sub> 2	.21	-	.03
F	<i>Ranunculus testiculatus</i> (a)	-	-	<sub>b</sub> 107	<sub>a</sub> 2	<sub>c</sub> 195	.39	.00	2.03
F	<i>Sisymbrium altissimum</i> (a)	-	-	<sub>a</sub> 2	-	<sub>a</sub> 3	.03	-	.03
Total for Annual Forbs		0	0	350	21	499	2.22	0.04	5.84
Total for Perennial Forbs		148	167	79	0	9	0.98	0	0.21
Total for Forbs		148	167	429	21	508	3.21	0.04	6.05

Values with different subscript letters are significantly different at alpha = 0.10

BROWSE TRENDS --

Management unit 18A, Study no: 29

Type	Species	Strip Frequency			Average Cover %		
		'97	'02	'07	'97	'02	'07
B	Artemisia tridentata wyomingensis	27	21	24	3.38	5.01	3.45
B	Cowania mexicana stansburiana	9	6	7	4.37	2.73	2.63
B	Gutierrezia sarothrae	36	4	15	.77	-	.13
B	Juniperus osteosperma	3	3	2	3.97	5.91	3.44
Total for Browse		75	34	48	12.50	13.67	9.65

CANOPY COVER, LINE INTERCEPT --

Management unit 18A, Study no: 29

Species	Percent Cover		
	'97	'02	'07
Artemisia tridentata wyomingensis	-	5.21	6.36
Cowania mexicana stansburiana	2.79	4.96	5.56
Gutierrezia sarothrae	-	-	.81
Juniperus osteosperma	6.00	6.15	7.76

KEY BROWSE ANNUAL LEADER GROWTH --

Management unit 18A, Study no: 29

Species	Average leader growth (in)	
	'02	'07
Artemisia tridentata wyomingensis	1.2	1.2
Cowania mexicana stansburiana	1.4	2.7

POINT-QUARTER TREE DATA --

Management unit 18A, Study no: 29

Species	Trees per Acre		Average diameter (in)	
	'02	'07	'02	'07
Juniperus osteosperma	89	83	6.6	7.2

# BASIC COVER --

Management unit 18A, Study no: 29

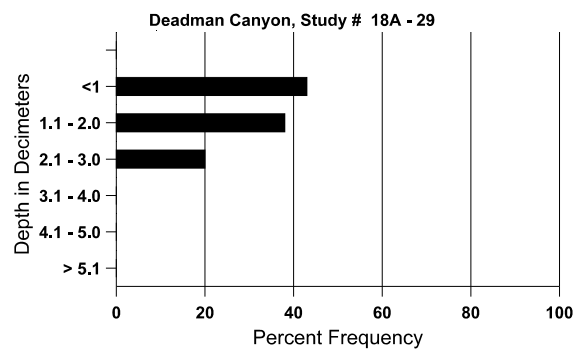
Cover Type	Average Cover %				
	'83	'89	'97	'02	'07
Vegetation	3.25	6.00	34.40	31.05	36.88
Rock	1.50	3.75	1.70	3.20	1.82
Pavement	3.25	17.00	7.44	11.06	10.84
Litter	73.50	57.25	51.37	50.00	34.09
Cryptogams	1.50	1.50	1.52	2.13	2.04
Bare Ground	17.00	14.50	7.66	20.22	22.73

# SOIL ANALYSIS DATA --

Herd Unit 18A, Study no: 29, Deadman Canyon

Effective rooting depth (in)	Temp °F (depth)	pH	Clay loam			%OM	ppm P	ppm K	dS/m
			%sand	%silt	%clay				
10.6	59.5	7.3	42.7	28.7	28.6	3.7	6.8	198.4	.6

# Stoniness Index



# PELLET GROUP DATA --

Management unit 18A, Study no: 29

Type	Quadrat Frequency		
	'97	'02	'07
Rabbit	47	55	69
Elk	-	-	-
Deer	29	22	1
Cattle	-	-	1

Days use per acre (ha)	
'02	'07
-	-
-	1 (2)
58 (142)	14 (35)
-	-

BROWSE CHARACTERISTICS --  
Management unit 18A, Study no: 29

		Age class distribution (plants per acre)					Utilization					
Y e a r	Plants per Acre (excluding seedlings)	Seedling	Young	Mature	Decadent	Dead	% moderate	% heavy	% decadent	% dying	% poor vigor	Average Height Crown (in)
<i>Artemisia tridentata wyomingensis</i>												
83	<b>499</b>	66	233	266	-	-	33	0	0	-	0	38/45
89	<b>832</b>	-	466	333	33	-	84	4	4	-	0	30/45
97	<b>800</b>	40	380	400	20	140	8	0	3	-	0	24/33
02	<b>880</b>	-	20	780	80	60	36	0	9	-	0	27/39
07	<b>1000</b>	-	-	580	420	140	24	6	42	10	18	28/37
<i>Cowania mexicana stansburiana</i>												
83	<b>199</b>	-	33	133	33	-	17	83	17	-	17	38/33
89	<b>166</b>	-	-	66	100	-	80	20	60	20	20	33/38
97	<b>180</b>	60	20	160	-	40	0	0	0	-	0	77/75
02	<b>120</b>	20	20	100	-	20	33	17	0	-	0	74/82
07	<b>140</b>	-	-	80	60	-	43	14	43	14	14	95/101
<i>Gutierrezia sarothrae</i>												
83	<b>633</b>	66	400	233	-	-	0	0	0	-	0	10/13
89	<b>33</b>	-	-	33	-	-	0	0	0	-	0	11/9
97	<b>1700</b>	-	380	1120	200	240	0	0	12	7	7	9/10
02	<b>120</b>	-	-	80	40	40	0	0	33	17	17	5/9
07	<b>420</b>	-	-	420	-	-	5	0	0	-	0	7/7
<i>Juniperus osteosperma</i>												
83	<b>0</b>	-	-	-	-	-	0	0	0	-	0	-/-
89	<b>33</b>	-	-	33	-	-	0	0	0	-	0	124/63
97	<b>60</b>	-	20	40	-	60	0	0	0	-	0	-/-
02	<b>60</b>	-	-	40	20	40	0	0	33	-	0	-/-
07	<b>40</b>	-	-	40	-	20	0	0	0	-	0	-/-